The Governor's School of New Jersey

Application for the

2018 Governor's School of Engineering & Technology

at Rutgers University School of Engineering

July 1 - July 27, 2018

Please read entire package.

Applications that are incomplete, do not conform to the application instructions, or do not meet deadlines will not be considered.

PROGRAM OVERVIEW

The Governor's School of Engineering & Technology (GSET) is a unique and intensive residential summer program that brings together some of New Jersey's most talented and motivated high school students. At no cost to their families, students spend one month of the summer following their junior year studying on the campus of the Rutgers University School of Engineering. Through team-based courses in areas such as "Robot Soccer" and research projects ranging from designing water purification systems for the developing world to using "Wiimotes" for medical rehabilitation, students collaborate on cutting-edge topics. The scholars work with peers and professors who are both very smart and very enthusiastic about engineering and technology.

GSET aims high. Scholars gain hands-on experience in research and work on challenging and open-ended problems with others who share their love for engineering and technology. Free of grades and official credit, GSET emphasizes current research trends and teamwork. The hands-on learning environment is unique, non-traditional, and inspirational. For many of our scholars, this is their first opportunity to collaborate with other students with the same academic talent and motivation. It's no surprise, then, that our alumni consider GSET to be not just an important educational foundation, but also one of the best experiences of their lives.

Throughout the program, scholars are encouraged to take personal responsibility for their education and to develop their ideas**;** entrepreneurship is highly encouraged. Governor's School scholars can expect to be challenged and to work very hard. In return, they will reap the benefits of an environment in which discovery and the pursuit of knowledge are primary, but in which everyone has a lot of fun. Scholars can also expect to develop strong academic relationships with their research mentors at Rutgers, engineering professionals, and each other.

ELIGIBILITY

To be considered for the Governor's School of Engineering & Technology, a student must meet the following criteria:

- The student must be a New Jersey resident and be a high school junior during the 2017-2018 school year.
- The student must have a very strong interest in engineering and technology and be committed to the acquisition of knowledge and the pursuit of opportunities in that field.
- The student must be willing to live on campus for the duration of the program. Saturdays and Sundays make up part of the program**;** there will be no weekend leaves of absence.
- The applicant must be one of the top students in his or her school. The student should have primarily "A" grades in honors math and science classes and outstanding scores on standardized achievement tests. Students who have demonstrated very strong abilities in engineering outside the classroom can also be strong candidates for the Governor's School in spite of weaker standardized test scores. Competitive candidates often rank in the top 5% of their class and score above the 90th percentile on standardized tests. A student whose standardized test scores are below the 90th percentile but rank among the best in this/her school may still apply if he or she is otherwise qualified.

The Governor's School encourages all qualified applicants regardless of sex, race, color, creed, national origin, or physical handicap.

PROGRAM DESCRIPTION

Core Courses: Robotics - students work in teams of 4 to build and program robots to solve design challenges and complete tasks; and Physics - this course is about some of the most exciting physics of the last 100 years, how they were discovered, and what we might expect to learn in the near future.

Elective Courses: Each Engineering & Technology scholar has the opportunity to select two electives. The electives for 2017 were as follows: Earthquake Resistant Structures; Engineering the Way for Medical Advancements; Everything's Material! Diving into the Exciting Field of Materials Science and Engineering; Fundamentals of Micro- and Nanofabrication; Fundamentals of Radio-Controlled Flight; Game Design; Introductory Electronics for Robotics; Virtual Research Group Module Pilot Study.

Research Projects: The cornerstone of the Engineering & Technology experience is a small group research and design project, completed under the tutelage of an experienced research mentor from academia or industry. In groups of three or four, scholars investigate and attempt to solve a complex and novel problem. Each group writes a conference-style research paper and presents its results at the Governor's School Research Symposium in front of an audience of professors, dignitaries, industry members, and invited guests. At the conclusion of the research experience, scholars should expect to have made significant connections with their research mentors and to have gained scientific maturity. The project topics vary from year to year and are aimed at having representation from each engineering discipline.

The 2017 projects were: An Ensemble-Based Approach for Classification of High-Resolution Satellite Imagery of the Amazon Basin; Analysis and Construction of a Bipedal Walking Robot; Applications of E-textile Pressure Sensors; Assessment of Silver Nanorod Synthesis; Autonomously Solving Mazes with Robots; Creation and Analysis of a Hybrid Wind Turbine; Designing a Centrifugal Pump System for High Altitude Water Crises; Designing an Unmanned Aerial Vehicle (UAV) for Humanitarian Aid; Essential Tremor Measurement and Analysis; Fabrication and Characterization of Polymeric Sutures and Brain Stents; Green Roof Development in Urban Areas; Implementing A Visual Factory Check in Silver Line; Piezoelectric Energy Harvesting with 3D-Printed Light-Up Shoe; Predicting Volatility in the S&P 500 through Regression of Economic Indicators; Temperature-Dependent Evolution Study of Sulfated Metal Catalysts Using FTIR Spectroscopy; Using Virtual Reality for an Immersive Experience in the Water Cycle; Wearable Flexible Solar Cell Charger. A list of GSET research projects and links to the research papers are available at http://soe.rutgers.edu/governors-school-engineering-technology-research-journals

Site Tours: Each Engineering & Technology scholar has the opportunity to visit local corporations to learn about future career opportunities. The tour destinations change each year. Tours for 2017 were conducted at: PSEG; Johnson & Johnson; Silverline; Rutgers University Eco Complex; Thorlabs; Boeing; Bristol-Myers Squibb; Lockheed Martin.

Guest Speakers: Distinguished guest speakers are a part of each year's program. These speakers are leaders in either academia or industry, and are excited to share current developments in engineering as well as career advice. Scholars in the 2017 program heard from: Dr. Biju Parekkadan (Biomedical Engineering Professor, Rutgers School of Engineering); Dr. Wise Young (Neuroscience and Biomedical Engineering Professor, Rutgers School of Engineering); Mike Swift (founder of Major League Hacking); Dr. Thomas Papathomas (Psychology and Biomedical Engineering Professor, Rutgers School of Engineering); Dr. Franklin Moon (Civil & Environmental Engineering Professor, Rutgers School of Engineering); Dr. Prabhas Moghe (Biomedical Engineering Professor, Rutgers School of Engineering); Dr. Ronke Olabisi (Biomedical Engineering Professor, Rutgers School of Engineering)

Enrichment Activities: A number of supplementary activities reinforce ideas in engineering.

- Life Skills Days provide exposure to many important skills an engineer needs to know, yet may not have seen before.
- College Question and Answer session with current scholars from elite universities, a half-day simulation of the team design process, recreational athletics activities, and a student talent show.
- Activities based on admitted scholars' expressed interests are also included, customizing each year's program.

THE SELECTION PROCESS

To apply for the Governor's School of Engineering & Technology, a student must be nominated by his or her high school's nominating committee. If the high school's junior class contains at most 325 students, only one student may be nominated for each Governor's School program. If the high school's junior class has between 326 and 650 students, two students may be nominated for each Governor's School program. Three students may be nominated only if the junior class is comprised of more than 650 students.

Students chosen by their high school's nominating committee are termed **"**nominees**.**" The nominee is responsible for completing all parts of the application, ensuring that all necessary supplements (including official transcripts, copies of PSAT scores, and the principal's signature) are in order, and verifying that the application has been submitted before the deadline. **The application must be emailed by the high school, NOT the applicant, as a PDF document conforming to the following naming convention: Last Name_First Name_County.pdf (ex. Jones_Mary_Monmouth.pdf), and sent directly to Rutgers University School of Engineering at the following address gsetrutgers@gmail.com. Applications must be emailed on or before January 11, 2018, 11:59 p.m.**

The Governor's School will confirm receipt of the application by late February in an email to the nominee, the parents/guardian, the principal, and the school guidance counselor listed on the application. Please note that incomplete applications (missing any required document) will not receive full consideration. At Rutgers, a panel of professors, researchers, and educators will review nominees' applications. Using the criteria below, this panel will choose the Governor's Scholars and invite those students to attend the Governor's School. The committee's decision will be emailed to the student on **April 2, 2018**. **Students who are selected must then submit the online acceptance form by *April 9, 2018, 11:59 p.m***. If the online acceptance form is submitted after **April 9, 2018, 11:59 p.m.**, your acceptance to the Governor's School will be rescinded. The admissions process is very competitive**;** in recent years, 15% - 25% of nominees have been offered admission.

SELECTION CRITERIA

The selection committee for the Governor's School of Engineering & Technology aims to craft a student body made up of New Jersey's most talented and enthusiastic students. Our student body should be diverse in myriad ways. Our students should possess a great range of gifts in technology, the arts, humanities, and the sciences. Overall, the committee chooses the students who will best take advantage of the opportunities presented by the Governor's School.

Decisions are based on the following qualitative and quantitative criteria:

- The nominee's high school transcript and class rank, which should demonstrate that the student is at or near the top of his or her class.
- The nominee's essays and reasons for wanting to attend the Governor's School
- Letters of recommendation
- The nominee's extracurricular activities and community service pursuits
- The nominee's academic and extracurricular honors and accomplishments
- The nominee's standardized test scores (PSAT preferred)

We expect Governor's Scholars to exhibit great creativity and a unique passion for the nature of our Governor's School. We look for students who have shown a strong interest in engineering, technology, science, and mathematics, as well as an open mind and the ability to work on a team to explore these interests further. We want to know what a nominee hopes to gain from the Governor's School experience, as well as what he or she hopes to contribute to the program. In general, nominees who have demonstrated a fervent interest in engineering and technology both inside and outside of the classroom will be most successful in the admissions process. A student with perfect standardized test scores but only superficial interest in the nature of the school is not a competitive candidate. Of course, our scholars are not only devoted to engineering and technology, but *also* have outstanding test scores and rank at the absolute top of their class. We are privileged to choose the best of the best.

CONTACT INFORMATION

Dr. Ilene Rosen, Program Director Jean Patrick Antoine, Associate Director

Web: http://soe.rutgers.edu/gset *(Engineering only)*
http://www.nj.gov/govschool/ *(all programs)*

Email: gsetrutgers@gmail.com

Telephone: (848) 445-4753

APPLICATION INSTRUCTIONS

Step 1: Review the program information and descriptions in this packet. We also highly recommend that you and your family visit our web site at **http://soe.rutgers.edu/gset** in order to see pictures and videos and research papers from past years.

Step 2: Complete the Application Cover Sheet (page 5 of this packet). The cover sheet should be the first page of your submitted application. Follow the instructions for the online Applicant Information Data form. After you have completed and submitted the form you will receive a confirmation email, which you should print and attach to the coversheet.

Step 3: Include the Application Checklist (page 6 of this packet) as the second page of your application. Portions of this checklist must be completed by your school principal.

Step 4: Attach a list of your extracurricular activities in order of their importance to you, with emphasis on activities requiring a substantial amount of your time. These can include school sponsored activities, work experience, community service, as well as science, artistic or athletic programs. Be sure to include leadership roles you hold in any of these activities and the amount of time you spend on these activities. Along with this list, please note any honors (academic or extracurricular) that you have received.

Step 5: Include answers to each of the following essay questions and short responses. We recommend writing about 1 page, single spaced, for each essay question. The short responses can be answered in about 2 paragraphs each.

Essay 1) Create an autobiographical sketch of your background, history, interests, and ambitions. Be sure to describe what makes you unique.

Essay 2) Why would you like to attend the Governor's School of Engineering &Technology? What do you hope to gain from and contribute to the program? Be sure to tell us about your interests in engineering and technology, how they've developed, and any steps you have taken to explore these disciplines.

Short Response 1) Tell us about your most meaningful extracurricular activity or interest.

Short Response 2) Discuss an idea in engineering, technology, science or math that you find fascinating. Why does it intrigue you? You can choose a topic as general as a whole discipline or as specific as a particular problem, challenge, or invention.

Short Response 3) Propose a specific engineering or technology problem you'd like to be working on ten years from now. Why is the problem interesting, and how do you hope to approach it?

Step 6: Include recommendation letters with original signatures from two people not related to you. At least one of these letters must come from a high school teacher. The second letter may come from another teacher, a club advisor, or a mentor.

Step 7: Verify that your high school will include your official transcript (including junior year grades) and official 2016 PSAT scores. If you did not take the PSAT in 2016, include your 2015 scores. You may also include your SAT scores. If you have not taken the PSAT or SAT, be sure your principal indicates this on his or her checklist.

Step 8: Compile the application in the sequence of these steps above, and create a PDF **that conforms to the following naming convention: Last Name_First Name_County.pdf**. (ex. Jones_Mary_Monmouth.pdf).

Step 9: Once your application is complete, it is your responsibility to confirm with your school counselor that the application has been emailed to Rutgers University School of Engineering by the **January 11, 2018, 11:59 p.m.** deadline.

DATES TO REMEMBER

January 11, 2018, 11:59 p.m.: Completed applications must be emailed by the high school to Rutgers University School of Engineering. **APPLICATIONS THAT ARE EMAILED AFTER THIS DATE WILL NOT BE CONSIDERED.**
By late February, 2018: The applicant, the parents, the principal and the school guidance counselor listed on the application will receive an email confirming the receipt of your application.
April 2, 2018: You will receive an email announcing the selection committee's decision.
April 9, 2018, 11:59 p.m.: Online acceptance form submission deadline. **IF THE ONLINE ACCEPTANCE FORM IS SUBMITTED AFTER THIS DATE, YOUR ACCEPTANCE TO THE GOVERNOR'S SCHOOL WILL BE RESCINDED.**
July 1 - July 27, 2018: The Governor's School will be in session on the campus of Rutgers University School of Engineering.

The Governor's School of New Jersey

2018 GOVERNOR'S SCHOOL OF ENGINEERING & TECHNOLOGY
at Rutgers University School of Engineering

Application Cover Sheet

INSTRUCTIONS FOR ONLINE APPLICANT INFORMATION DATA FORM

Please visit the Governor's School of Engineering & Technology web site at:

http://soe.rutgers.edu/gset/2018application

Follow the link to the 2018 Applicant Information Data form:

1. Complete and submit this form online.
2. Be sure to print the confirmation email after submitting the form.
3. Attach the printed document to this application.

NOTE: APPLICATIONS MISSING THE PRINTED ONLINE APPLICANT INFORMATION DATA FORM WILL NOT BE CONSIDERED.

IMPORTANT DATES

January 11, 2019, 11:59 p.m.
Application deadline

Late-February
Junior grades/PSAT scores deadline

April 2, 2018
Admissions decisions announced by email

April 9, 2018, 11:59 p.m.
Online acceptance form deadline

July 1 - July 27, 2018
GSET in session

Additional Information:

Please indicate the three engineering/technology disciplines that most interest you (i.e. electrical, mechanical, biomedical, civil, industrial, material science, chemical, etc.):

1._____ 2._____ 3._____

STUDENT AND PARENT CERTIFICATION

___ I am a resident of New Jersey.

___ I expect to be a high school senior in the 2018-2019 school year.

___ I am willing and able to attend the entire Governor's School session.

_____ _____
Signature of Student ***Date***

_____ _____
Email of Student ***Phone Number of Student***

This is to certify that I give my permission for the student named above to participate in the Governor's School of Engineering & Technology at Rutgers University School of Engineering, in full-time residence.

_____ _____
Signature of Parent/Guardian ***Date***

APPLICATION CHECKLIST
(Please include this page as "Page 2" of your application)

NOMINEE'S CHECKLIST: ***INCOMPLETE APPLICATIONS WILL NOT BE CONSIDERED.***

___ I've included the Application Cover Sheet as Page 1 of my application.

___ I've included this checklist as Page 2 of my application.

___ I've attached a list of my extracurricular activities and my extracurricular and academic honors.

___ I've included responses to all requested essay prompts as per the guidelines on Page 4.

___ I've attached two letters of recommendation with original signatures as per the guidelines on Page 4.

___ My school has included my official high school transcript and copies of my PSAT (or other standardized test) scores.

___ I am a resident of the state of New Jersey and will complete my junior year of high school in June 2018.

___ I have kept a copy of my application for my own records.

I have reviewed the checklist above, and have included all necessary and appropriate application materials. All of the information submitted as part of my application is factual and truthful to the best of my knowledge.

_____ _____

Nominee's Name (please print) **Nominee's Signature**

PRINCIPAL'S CHECKLIST:

___ The nominee is one of our top students and has expressed a strong interest in the Governor's School of Engineering & Technology.

___ Our school has nominated the correct number of students. (If the junior class has 1 – 325 students, 1 nominee is permitted. If there are 326 – 650 students, 2 nominees are permitted. If there are more than 650 juniors, 3 nominees are permitted.)

___ The nominee has included his/her application Cover Sheet, this checklist, a list of activities and honors, essay responses, and two letters of recommendation (at least one letter from a high school teacher; the other may be from another teacher, a club advisor, or a mentor).

___ I have included the nominee's high school transcript and copies of his or her PSAT (or other standardized test) scores.

___ The transcript includes grades from the first marking period of the 2017-2018 school year.
___ The nominee will forward his or her junior year grades to the Governor's School once they become available.
___ I have included the nominee's 2017 PSAT scores. (Preferred)
___ The nominee did not take the PSAT in 2017. I have included his/her 2016 PSAT scores.
___ I have included the nominee's SAT scores.
___ No PSAT/SAT scores are available for this nominee.

___ The nominee is a conscientious, eager student and ranks near the top of his/her class.

Nominee's high school GPA _____ Number of Students in Junior Class_____ Nominee's Class Rank _____

___ The nominee's standardized test scores are among the best in our school.

PSAT Scores: Verbal ____ Math____ Writing ____ Test Date (circle one): 2017 2018

___ This nominee has not been nominated to more than one Governor's School.

___ The nominating high school has kept a copy of this application on file.

___ The nominee has included answers to the three short response questions.

I have reviewed the checklist above, and have included all necessary and appropriate application materials. All of the information submitted as part of this application is factual and truthful to the best of my knowledge.

_____ _____

Principal's Name (please print) **Principal's Signature**